

Quick scan: How polluted is the air you breathe?

TNN | Oct 20, 2018, 05.56 AM IST



AHMEDABAD: It's the time of the year again when citizens in the national capital and closer home in Ahmedabad get jittery about the very air they breathe. Given the serious air pollution problem, a team of faculty members and students of IIT Gandhinagar (IIT-Gn) developed an indigenous laser-based portable device which measures the level of pollutants in the air.

The current system, employed by CPCB or SAFAR, has fixed devices and can't ascertain the local impact of vehicular and other types of pollution.

The IIT-Gn team claims to have employed the first portable tunable diode laser spectroscopy (TDLS) system in the Indian context, which provides a highly localized reading of air pollution, be it outside your home or on the road you use.

HOW THE SYSTEM WORKS

➤ A laser diode is fired against a photodetector in the device at the desired height

➤ The laser detects specific molecules and the dissonance reading is relayed to the amplifier and oscilloscope which appears as a graph on the software

➤ The graph then can be decoded on the basis of the elements covered in the experiment, for example carbon dioxide and water vapour was studied in this experiment



➤ Exhaustive data collection from various sites can create a map showing the impact of vehicular pollution, wind speed and precipitation

MEAN VALUE OF MOLE FRACTION FOR CARBON DIOXIDE

Palaj,
Gandhinagar

438 ppm

Infocity,
Gandhinagar

495 ppm

Chandkheda,
Ahmedabad

495 ppm

Sabarmati,
Ahmedabad

740 ppm

with doctoral student Anirban Roy as the primary investigator. Other members include Neetesh Kumar Sharma from IIT-Gn and Abhishek Upadhyay from the University of Strathclyde, Glasgow.

“The device has to be kept at the desired level – at ground level or a particular height – after which the laser beam, tuned for specific particle size and detection of specific components, in this context carbon dioxide, takes readings. We have also developed an accompanying mobile phone application to give realtime readings. Compared to other systems, it is portable and can be fitted to a car or even buses, to create an exhaustive pollutant map,” said Chakraborty.

Roy said urban areas are battling pollution from multiple sources, from thermal power stations to vehicular population. “The global average of CO₂ is 406.7 ppm (parts per million), which was found on the outskirts of Ahmedabad. Inside Ahmedabad, these values were found to be alarmingly high, 727 ppm and 877 ppm, at Chandkheda and Sabarmati, the two locations chosen for the pilot study,” he said.

The project which began in 2016 will now be expanded to more polluted locations such as Vapi and Ankleshwar, members of the team said.